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Riki Ogawa

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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.

1940 DUKE STREET

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EXAMINER

PATEL, JAYESH A

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NOTIFICATION DATE

DELIVERY MODE

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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/666,241	Applicant(s) OGAWA ET AL.	
	Examiner JAYESH A. PATEL	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Arguments

Applicant's arguments with respect to claims 1-12 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

Claims 1 and 7 objected to because of the following informalities: “projecting inspecting light” at line 4 of claims 1 and 7 should be “projecting **an** inspecting light” . Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-6 and 7-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim 1 and 7 contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1 and 7 contains “Fixing the specimen surface to a reference level, while the servo driving is stopped” at lines 14-15 which raises new matter. The disclosure on page 4 lines 15 and 16 discloses “Fixing the specimen surface to a reference

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level, if the intensity is less than the specific threshold value" and is not disclosing while the servo driving is stopped.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-6 and 7-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitation "the direction of level" is not clear as to which direction and to level of what ?

Claim 3. It is unclear as to "the reference level" of what ?. i.e. to the reference level of light or position of the stage.

Claims 1-6 and 7-12 recites the limitation "the direction of level" in lines 6 of claims 1 and 7. There is insufficient antecedent basis for this limitation in the claims.

Claims 1-6 and 7-12 recites the limitation "the reflected light of the level measuring light" in lines 8 of claims 1 and 7. There is insufficient antecedent basis for this limitation in the claims.

Claims 1-6 and 7-12 recites the limitation "the reflected light " in lines 11-13 of claims 1 and 7. There is insufficient antecedent basis for this limitation in the claims.

Claims 1-6 and 7-12 recites the limitation "the level measuring light " in lines 11-12 of claims 1 and 7. There is insufficient antecedent basis for this limitation in the claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3,5,7-9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi (US 5959721) hereafter Nishi as best understood by the examiner.

1. Regarding claim 1, Nishi discloses a specimen surface level adjusting method used in an apparatus for inspecting a pattern on a surface of a specimen with a pellicle frame, wherein the apparatus (**Fig 1**) comprises an optical system (**Fig 1 elements 7 an illumination optical system and Element 15 the projection lens optical system, Col 6 lines 39 and 46**) of inspecting the pattern (**Pattern**

on a substrate at Col 2 lines 62-63) on the basis of a detected image obtained **(Col 5 lines 33-35 and Col 14 lines 1-7 where the image is disclosed)** by projecting inspecting light onto the specimen surface **(Illuminating light from element 7 passes through reticle 1 and onto the wafer 16 which does the projection of the image of the pattern on the reticle on to the wafer at Col 7 lines 8-13)** and of scanning the specimen two-dimensionally **(a stage 57 for moving the substrate two dimensionally at col 3 lines 2-3)**; a moving mechanism of moving the specimen in the direction of level during the optical system scans the specimen **(stage 57 moving the wafer substrate at col 4 lines 13-14 and Col 7 lines 14-35)**; an auto focus mechanism of focusing **(best focus)** the optical system on the specimen surface by servo driving the moving mechanism **(varying the wafer stage in the Z direction or upwards)** on the basis of the intensity of the reflected light of the level measuring light **(illuminating light from element 7 is projected on to the wafer substrate)** projected onto the specimen surface **(Col 14 lines 5 -24)**. Nishi does not expressly recite the exact wording from the claim that the method comprising: detecting the loss of the reflected light caused by the pellicle frame blocking out the level measuring light or the reflected light; stopping the servo driving, if the loss of the reflected light is detected; and fixing the specimen surface to a reference level while the servo driving is stopped.

Nishi however discloses a difference in the lights **L1 and L2**, A prealignment control unit 14 calculating the **(change in the angle ,Delta theta)**

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due to the difference and converting that difference into a **voltage signal** to be sent out to the rotatable stage and adjust it accordingly at **(Col 10 lines 58 through col 11 lines 27)**. Nishi also discloses in Figs 3a-3b, 4 and 8a-8b. Nishi explains the reticle frame in Fig 10b. Thus detecting the loss of the reflected light caused by the pellicle frame blocking the reflected light **(maps to sensor 40 fig 3b which detects the difference between the lights L1 and L2)** and stopping the servo if the loss of light is detected maps to **(a voltage signal to control (stop or start or vary or will not move the stage until the signal difference is received) according to the difference and hence the (delta theta) and will obviously stop (will not move until the difference in the signal is received) the servo (stage movement) due to the difference in the lights as seen in fig 4)**. If the difference is zero **(if $L2-L1$ equals zero than the motor receives zero voltage signal and therefore it does not move and it will stop)**. The fixing of the specimen surface to a reference level **(positional adjustment of the wafer and the wafer stage control is based on the output signals from the interferometers (based on the light intensities) at Col 7 lines 22, the main control unit 100 controls the operation of the wafer stage control unit and the prealignment stage control as seen in Fig 1 and Col 7 lines 37-55)**. One can obviously achieve the claimed invention using the teachings taught by Nishi i.e the main stage movement, aligning the pellicle and stopping the servo based on the difference in light (loss of light).

2. Regarding claim 2, Nishi discloses the specimen surface level adjusting method according to claim 1. Nishi disclose further wherein the measuring light is projected vertically onto the specimen surface as seen in Fig 1. Nishi however does not disclose the projection of the light is diagonal. One of ordinary skill in the art can make the light to project diagonally as claimed. The applicant has not shown the advantages of projecting the light diagonally and it is a design choice.

3. Regarding claim 3, Nishi discloses the positional adjustment of the wafer on the basis of the output signals from the interferometers at **(Col 7 lines 22-36)** which would adjust the specimen surface level according to claim 1, wherein the reference level is the level immediately before the specimen surface is fixed.

5. Regarding claim 5, Nishi disclose the specimen surface level adjusting method according to claim 1. Nishi disclose further wherein the reflected light is caused to enter an optical sensor including a plurality of photoelectric conversion elements **(optical signals received by the sensor 40 are subjected to A/D conversion where the optical light is converted to the digital signal or light to voltage at Col 11 Lines 4-19)**, and the loss of the reflected light **(difference)** is detected by monitoring the photoelectric conversion output of each of said plurality of photoelectric conversion elements **(difference in the lights L1 and**

L2 giving corresponding signals S1 and S2 calculated in terms of the voltage signal at Col 11 lines 1-26).

7. Regarding claim 7, see the expalantion of claim 1. Nishi further discloses the recording the position of the pellicle frame where the loss of the reflected light is detected before inspecting the pattern at **(Figs 7A-7B, 8A-8B and Col 13 lines 50 through Col 14 lines 24).**

8. Regarding claim 8, Nishi discloses the specimen surface level adjusting method according to claim 7. Nishi disclose further wherein the measuring light is projected from a single light source diagonally onto the specimen surface at **(as seen in Fig 3B where element 39 illuminates a diagonal light on to the specimen surface (reticle) and Col 10 lines 30-67)**

9. Regarding claim 9, Nishi discloses the specimen surface level adjusting method according to claim 7. Nishi discloses the positional adjustment of the wafer on the basis of the output signals from the interferometers at **(Col 7 lines 22-36)** which would adjust the specimen surface level according to claim 1, wherein the reference level is the level immediately before the specimen surface is fixed.

11. Regarding claim 11, Nishi disclose the specimen surface level adjusting

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method according to claim 7. Nishi disclose further wherein the reflected light is caused to enter an optical sensor including a plurality of photoelectric conversion elements **(optical signals received by the sensor 40 are subjected to A/D conversion where the optical light is converted to the digital signal or light to voltage at Col 11 Lines 4-19)**, and the loss of the reflected light **(difference)** is detected by monitoring the photoelectric conversion output of each of said plurality of photoelectric conversion elements **(difference in the lights L1 and L2 giving corresponding signals S1 and S2 calculated in terms of the voltage signal at Col 11 lines 1-26)**.

Claims 4 and 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi in view of Kawashima et al. (US 5124562) hereafter Kawashima.

Regarding Claim 4, Nishi discloses the specimen surface level adjusting method according to claim 1. Nishi however does not expressly recite the reference level is the average value of the level in a specific period of time before the specimen surface is fixed.

Kawashima discloses the reference level is the average value of the level in a specific period of time before the specimen surface is fixed at **(Col 11 Lines 3-6)**. Kawashima discloses detecting the surface position of an object quickly and with high precision **(Col 2 Lines 53-55)**. Both Nishi and Kawashima are analogous art and from the same field of endeavor, therefore it would have been obvious for one of ordinary skill in the art, at the time the invention was made to

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use the teachings of Kawashima in the device disclosed by Nishi for the above reasons.

Regarding Claim 10, Nishi discloses the specimen surface level adjusting method according to claim 7. Nishi however does not expressly recite the reference level is the average value of the level in a specific period of time before the specimen surface is fixed.

Kawashima discloses the reference level is the average value of the level in a specific period of time before the specimen surface is fixed at **(Col 11 Lines 3-6)**. Kawashima discloses detecting the surface position of an object quickly and with high precision **(Col 2 Lines 53-55)**. Both Nishi and Kawashima are analogous art and from the same field of endeavor, therefore it would have been obvious for one of ordinary skill in the art, at the time the invention was made to use the teachings of Kawashima in the device disclosed by Nishi for the above reasons.

Claims 6 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi in view of Yamada et al. (US 5323016) hereafter Yamada.

Regarding Claim 6, Nishi disclose the specimen surface level adjusting method according to claim 1. Nishi however does not expressly recite specimen

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surface is placed on a piezoelectric element, and a voltage applied to the piezoelectric element adjusts the level of the specimen surface.

Yamada discloses the specimen surface **(stage 3)** supported by three piezoelectric devices at **(Col 10 Lines 50-52)**. Also the fact that actuating the piezoelectric devices **(Col 10 Lines 50-52)** means an electrical signal (voltage) is applied to create motion. Nishi and Yamada are from the same field of endeavor and it would have been obvious for one of ordinary skill in the art to detect and correct the deviation of the specimen on the surface while keeping the specimen at the site without large displacement at correction **(Col 1 Lines 21-38)** as taught by Yamada in the apparatus of Nishi. Nishi also discloses a voltage signal corresponding to difference in theta at Col 11 line 18.

Regarding Claim 12, Nishi disclose the specimen surface level adjusting method according to claim 7. Nishi however does not expressly recite specimen surface is placed on a piezoelectric element, and a voltage applied to the piezoelectric element adjusts the level of the specimen surface.

Yamada discloses the specimen surface **(stage 3)** supported by three piezoelectric devices at **(Col 10 Lines 50-52)**. Also the fact that actuating the piezoelectric devices **(Col 10 Lines 50-52)** means an electrical signal (voltage) is applied to create motion. Nishi and Yamada are from the same field of endeavor and it would have been obvious for one of ordinary skill in the art to detect and correct the deviation of the specimen on the surface while keeping the specimen

at the site without large displacement at correction (**Col 1 Lines 21-38**) as taught by Yamada in the apparatus of Nishi. Nishi also discloses a voltage signal corresponding to difference in theta at Col 11 line 18.

OTHER PRIOR ART

Other prior art relevant to the subject matter and not relied on are (US 4943734), (US 5247329) and (US 5737084).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action. Any inquiry concerning this communication or earlier

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communications from the examiner should be directed to JAYESH A. PATEL whose telephone number is (571)270-1227. The examiner can normally be reached on M-F 7.00am to 4.30 pm (5-4-9). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

11/26/08

/Jayesh A Patel/
Examiner, Art Unit 2624

/Jingge Wu/
Supervisory Patent Examiner, Art Unit 2624